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ABSTRACT

It is proposed in this paper that there are two rules involved in Finnish vowel harmony--prescriptive and descriptive. The prescriptive rule requires a back vowel in the suffix whenever there is a back vowel in the root; the descriptive rule lets the value of the last non-neutral vowel spread to the suffix and additionally involves an analysis of long loan words into prosodic compounds. In the autosegmental framework, the former rule treats all front vowels as neutral in the harmonic process while the later follows the "native line" and there are only two neutral vowels. The neutral vowels get their front value by segmental prespecification. The suffix vowels left unspecified after spreading have their front-value by a late default rule. This default rule is supported by the fact that epenthetic vowels in Finnish are -back . It has been suggested that consonant gradation in Finnish has become semasiologized as it has divided the lexicon into strata characterized by specific functional-stylistic valencies. It is concluded that the two vowel harmony rules have done the same; they divide the lexicon in two, and the alternating cases codify socially significant information. (DJD)

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FINNISH VOWEL HARMONY AS A PRESCRIPTIVE AND DESCRIPTIVE RULE: AN AUTOSEGMENTAL ACCOUNT*

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The rule for Finnish vowel harmony states that in the root only either front or back vowels may occur and the last non-neutral root vowel determines the front/back quality of the suffix vowel. Additionally there are two neutral vowels, [i] and [e], which co-occur with all vowels. Many loan words, however, are exceptional and these have been explained by, e.g., adding [y] to the neutral vowels. In fact, there is free variation in these loans so that they appear with both front and back suffix vowels depending on the context but this is usually omitted in treatments of Finnish vowel harmony. However, since the vacillation is rather extensive we should describe both variants. In this paper, I propose two rules, one descriptive and one prescriptive. Some seemingly problematic forms are shown to be prosodic compounds in which case they obey the descriptive harmony rule. The prescriptive rule allows harmony only from back vowels and thus it treats all front vowels as neutral. The view is adopted here that since neutral vowels do not undergo the harmonic process their value is underlyingly specified in the segmental core. Autosegmental spreading skips these vowels on the assumption that a segment may not have more than one value for the same feature. Additionally, I propose a default rule for those vowels left unspecified in the harmony process. I suggest the default rule instead of spreading at two levels, as Vago has (1985) proposed, because two-level spreading does not generate both of the free variants.

THE HARMONIC FACTS AND RULES

Finnish has both root and suffix harmony in vowels. The former requires that within a root, only vowels from one or the other of the two sets below co-occur:

1. Front: [y, ö, ä] Back: [u, o, a]

The neutral vowels [i] and [e] occur with both sets. The domain of harmony is the word and thus in compounds the last word determines the suffix value. The vowel harmony rule applying in suffixes in native vocabulary is that suffix vowels agree in frontness with the root vowels; if there are only neutral vowels in the root the suffix has a front vowel. This is also the content of the prescriptive rule that is learned at school which we can express as follows:

2. The prescriptive rule: If there is a back vowel in the root, take a back vowel in the suffix, too; otherwise use front vowels in suffixes.

This is a prescriptive rule in the sense that it is explicit in the minds of Finnish speakers. The following illustrate the harmonic processes in native words:

3. Front vowels only

sydän+tä 'of the heart'
pöydä+llä 'on the table'
höyry+ssä 'in the steam'

4. Front vowels with neutral vowels

äidi+ltä 'from mother'
pimeä+ssä 'in the dark'
ilkeä+stä 'from the naughty'

5. Back vowels only

pouda+lla 'in sunny summer weather'
kuoka+lla 'with a hoe'
kuka+ssa 'in the flower'

6. Back vowels with neutral vowels

sotilas+ta 'of the soldier'
Suome+ssa 'in Finland'
kusiaise+lla 'on the ant'

7. Only neutral vowels

neiti+ä 'of the miss'
tie+llä 'on the road'
eines+tä 'of prepared food'

8. Compound words

virsi#kirja+ssa 'in the hymn book'
tarha#käärme+ttä 'of the garden snake'
yö#työ+tä 'of night work'

Loan words may violate root harmony, as one might expect, but these may also violate the suffix rule given above. The following tokens exemplify these cases. The roots have both front and back vowels but the suffix vowels are not [+back].

9. afääri+ä 'of the affair'
vulgääri+ä 'of vulgar'
kamyy+tä 'of Camus'

It is probably data like these that inspired Kiparsky to formalize the following rule (1973:36):

10. [+back] ---> [<back] / [<back] (Co [-round] Co)o # X___
-low o

This rule essentially states that the last non-neutral vowel determines the suffix vowel; if there are no non-neutral vowels, take the first vowel in the word. Kiparsky states in this connection that even if root harmony has exceptions, "[A]ffix harmony...is a totally regular process" (ibid.). In other words, we expect no exceptions to the rule in (10). However, there are numerous loans which do not follow this rule:

11. fakulteetti+ä 'of the faculty'
arkkitehti+nä 'as an architect'
ateisti+ä 'of the atheist'

12. hypoteese+j+ä 'hypotheses'
dynamiitti+nä 'as dynamite'
hyasintte+j+ä 'hyacinths'

The forms in (11) do not violate root harmony since the root has only back and neutral vowels but suffix harmony is not obeyed - the expected final vowel by rule (10) is [a]; those in (12) violate both harmonies: the roots have both front and back vowels and the suffix does not agree in frontness with the last non-neutral vowel.

Words of the type given in (11) and (12) have been explained in terms of "prosodic compounds". Sadeniemi (1949) suggests that speakers analyze these words into compound words. This explanation has been accepted recently by, e.g., Karlsson (1982) and Levomäki (1972b). Evidence for this analysis is, according to Sadeniemi (1949:75) the fact that in these forms there is a fixed secondary stress at the beginning of the second prosodic "morpheme" like in any compound word (e.g. kȉrja#kȁuppa 'bookstore');

13. áppelsȉini 'orange', karamȅlli 'candy', dynamȉitti

Sadeniemi also notes examples like the word [melli] from [karamelli] and [lisko] 'lizard' probably from [sisilisko] 'kind of lizard' which support the prosodic analysis proposed.

Lehiste (1964) has studied junctures or phonologically manifested boundaries in Finnish. She compared, e.g., following types of pairs:

14. a. lintuansa 'his bird, part.'
lintu-ansa 'bird trap'

b. rantautua 'to land to the shore'
ranta-utua 'shore-mist, part.'

There were clear phonetic cues ("differences in phonetic quality, segmental duration, vocal fold activity, and nasalization" ibid., 178-179) present in the compound words that distinguished them from the non-compounds. The prediction of the prosodic compound analysis would be that these same cues are present in those forms which are prosodically analyzed into compounds even if morphologically they are monomorphemic.

The strongest evidence at this point for the prosodic compound analysis comes from vowel harmony itself. Consider again words like those in (11): there is no reason why we should not have back vowels in the suffixes since the roots conform to root harmony but we, nevertheless, have front vowels there. All words in both (11) and (12) behave prosodically as if they were compound words:

11'. fakul#teetti+ä
arkki#tehti+ä
ate#isti+ä

12'. hypo#teese+j+ä
dyna#miitti+nä
hya#sintte+j+ä

Now these obey Kiparsky's rule. A fact that further adds plausibility to the compound treatment is that native Finnish roots are typically disyllabic and thus it would be natural for Finnish speakers to analyze these long loans into dimorphemic compounds. Also, the original words in the source language, usually Swedish, the first syllable of the second part carries primary word stress, which in Finnish marks the beginning of a word. Thus it would only have been natural that the borrowers would also originally, in the borrowing context, have treated them prosodically as two separate morphemes.

Next I want to introduce the free variation that can be observed in loans. The following form has appeared in recent works like in Vago (1985) and Levomäki (1972b) with a back suffix vowel:

15. analyysi+a

There is a tradition in Finnish linguistics that [y] is a neutral vowel in loan vocabulary and this explanation is the one evoked by Vago (though not fully accepted by Levomäki). Thus [a] in the suffix of (15) seems to follow a regular pattern as it is determined by the last non-neutral vowel.

My own intuition suggests [analyysi+ä] for (15). Levomäki (1972a) did a rather extensive survey about the harmonic behavior of suffixes in loan words and found free variation in all of the words given above. He gave exact percentages for each free variant of the words studied. In [analyysi+ä], for example, the front vowel occurred in 81.4% of the cases (ibid., 255). For other forms the percentage ranged between 4.2% (artikkele+i+ssä) and 98% (konduktööri+ä). Thus, free variation clearly is a reality to be accounted for.

I propose that this variation is due to the application of a prescriptive or a descriptive rule whose choice is determined by the social context, as Campbell (1977) has also suggested. Forms like those in (16) would result from the application of the prescriptive rule given in (2) in more formal styles where one is to some extent conscious of one's own linguistic performance. Note here that suffix harmony propagates across non-neutral [y], [ä] and [ö] as well as the neutral [i] and [e]:

16. synonyyme+j+a 'synonyms'
    vulgäari+a 'of vulgar'
    sutenöori+a 'of a pimp'
    appelsiine+j+a 'oranges'

The front variants in (17) would occur in more casual speech contexts where "how things are said" is not so central:

17. syno#nyyme+j+ä
    vul#gäari+ä
    sute#nöori+ä
    appel#siine+j+ä

To describe this free alternation I propose to retain the rule formalized by Kiparsky as the descriptive rule which is complemented by the prosodic compound analysis. The prescriptive, formal-style rule is that given in (2) which can be formalized as (18). This rule would then make every front vowel neutral, i.e., not just [i] and [e] but also [y] as in [analyysi+a], [ö] as in [jonglöore+j+a] and [ä] as in [vulgääre+j+a].

18. $V \xrightarrow{V}$ [+back] / [+back]...+(Co) ___

There are some derivational suffixes which do not generally alternate but which on their turn determine the front-back dimension of the following vowels; these have for the most part back vowels (Karlsson, 1982, 103). The forms in (19) illustrate these morphemes; they are followed by inflectional suffixes whose vowel frontness they determine.

19.	lehi+llo+j+a	'frames'
	mysti+kko	'a mystic'
	men+o+j+a	'expenses'
	liit+os+ta	'of the connection'
	tok+aise+ma	'said abruptly'
	pes+u	'washing'

It is not entirely clear whether these are still synchronically productive. Karlsson (ibid.) suggests that for the most part these have been lexicalized with a back vowel and thus do not undergo suffix harmony.

AN AUTOSEGMENTAL DESCRIPTION

The descriptive rule with the prosodic compounds is a rule that reflects a deep analysis of one's native language in terms of both prosody and morphology. In some sense the prescriptive rule also reflects a real situation in Finnish: it follows the suffixal behavior of the fully native vocabulary. Because of these similarities I will attempt to give a relatively uniform autosegmental account of both rules.

I adopt the following well-formedness conditions (Poser, 1982, 124):

20.A. No association lines may cross
B. All segments must be fully specified

The first condition must hold all through the derivation but (20.B) is an output condition. A value of a segment may be specified in three ways:

21.A. The value is specified in the segmental core and it does not participate in the prosodic processes
B. The value is obtained through autosegmental spreading
C. The value is assigned by a late default rule

These conditions are naturally highly relevant to the treatment of neutral vowels: are these associated to the autosegmental tier or not. If they are, how does autosegmental spreading skip them in order to avoid crossing of lines; if they are not, how do the neutral vowels get their value. Consider the example below:

* +B −B −B

22. n a i s e + l l a 'with the woman'

The neutral vowels are associated to the autosegmental tier but how do we get the back value to the suffix without crossing of lines? We may leave out the associations from the [i] and [e] but then the question is how do they get assigned a value.

Vago (1985) reviews three basic approaches to neutral vowels. In treatments where these vowels are not seen as P-bearing units they can get their values by either a late default rule as, e.g., Van der Hulst (1984) suggests or by an early redundancy rule applying on the segmental level, as Vago (1985) advocates. In what follows I will adopt a hybrid of these two views. I reject part of Vago's proposal since it does not deal satisfactorily with the the problem of free variation.

Following Van der Hulst (1984) I propose that there is a late default rule which supplies [-back] value for those vowels which have not yet received any specification in the course of spreading. The form of this rule would be informally as follows:

23. Late default rule: [-back]
(
vowel

I also assume that since neutral vowels do not undergo the harmonic process they are specified for the front/back feature in the segmental core. Clements (1980) and Steinberger and Vago (in press) use similar assumptions. Since one segment may not have more than one association for the same feature, autosegmental spreading skips over neutral vowels. Vago (1985) makes this same assumption.

The decision made here is that [-back] is the default value in the harmony system. What kind of evidence might bear on that choice? The strongest support comes from the fact that it is a front vowel that is epenthesised in loan words which violate the native morpheme structure. In Finnish there may occur word-finally only one consonant and it must be [t n s l] or [r], and when a foreign word violates this an [i] is inserted to the end.

24. trendi Kentti etydi kirahvi Nyy Jorkki
'trend' 'Kent' 'etude' 'giraffe' 'New York'

Even if the loan ends in an "acceptable" consonant, it will have an epenthetic [i] in other cases than nominative or if it is monosyllabic (as also was the case above):

25. Eeden 'Eden' - Eedeni+ssä 'in Eden'
plankton 'plankton' - planktoni+ssa 'in plankton'
[sili] 'Gilles' [ʒil]

There is also a linking vowel [e] in many native words. Consider the following:

26. sisar 'sister' - sisaren 'of sister'
    sävel 'melody' - sävelen 'of melody'

There have been arguments for and against [e]-insertion in Finnish in general (e.g., Campbell, 1975) but the fact is that in stem-formation it is [e] that is involved. Stem-formation typically involves also consonant changes, like in [tennis] - [tennikse+n], but the vowel is [e]. Thus, in both borrowing and in stem-formation a front vowel, [i] or [e], is used (which also happen to be the neutral vowels in vowel harmony). I take this to be evidence forthe default status of [-back]: when nothing else is specified, take the front value.

To recapitulate: neutral vowels are underlyingly specified in the front/back dimension and spreading does not attach any value on them since they are already specified; those vowels left unspecified in this process will get their value by a late default rule.

An alternative would be to have all front vowels receive their value by default. This is, however, excluded by forms like [afääri+ä] where the suffix would be assigned a back vowel if [ä] were to be specified by default after spreading. A second hypothesis would be that all neutral vowels have their value by default. This is rejected because it would complicate the prescriptive rule. I will return to this below.

Next I will give examples of the operation of the two rules involved. In (27) and (28) we will look at the descriptive rule. The values immediately under the example words represent the segmental specification of neutral vowels. In (27.e) the suffix has been assigned a value by the default rule since there is no spreading involved in words which only have neutral vowels.

27.

```
   -B -B  -B                    +B +B  +B
    |  |   |                     |  |   |
(a) p ö  y d ä + l l ä   (b)    p o  u d a + l l a

   -B
    |
(c) ä i t i + ä              +B +B
        -B  -B               |  |
                         (d) S u  o m e + s s a
                                        -B

(e) v i  i d e + s s ä
     -B -B  -B       |
                    -B
```

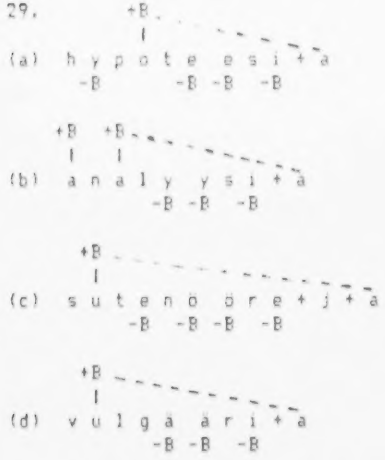
The following show how this rule operates in an ordinary compound word (28.a) and in prosodic compounds (28.b-d).

28.

```
                      +B
                       |
(a) v i r s i # k i r j a + s s a   'in the hymn book'
     -B    -B    -B
```

In (29) we see the operation of the prescriptive rule which assigns [+back] value in the suffix whenever the root has at least one back vowel. This rule simply considers all front vowels to be specified in the segmental core.

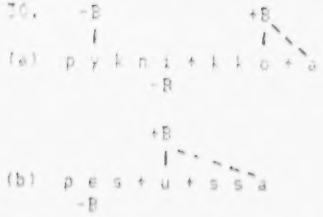
29.



If we were to specify neutral vowels by the default rule, it would not work in the prescriptive case in (29) where all front vowels are neutral. When autosegmental spreading takes place we could prevent it from attaching values to [i] and [e] (as in 29.a) by requiring that spreading is structure preserving because there are no corresponding unrounded back vowels. This solution would not work for the other cases, though: spreading would make all of the non-neutral front vowels in (29 b-d) into back vowels and we would have forms like *[analuusi+a], *[sutenoore+j+a] and *[vulgaari-a].

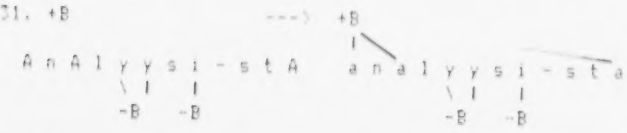
Those suffixes which do not alternate are preassociated to the harmonic tier and thus are opaque. They block the spreading from the left but spread their value to their right:

30.



Vago's (1985) own 'segmental analysis' of neutral vowels involves lexical prespecification of the front/back dimension of these vowels on the segmental tier, as is the case in this paper. The difference between the analyses lies in the fact that where I have a late default rule, in Vago's analysis there is spreading also on the segmental tier. This spreading applies "by convention" after spreading on the the autosegmental tier and it takes place only if the autosegmental spreading has left something unspecified. Vago treats the Finnish [y] as neutral and gives the following derivation (ibid., 14):

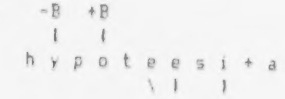
31.



Here [+back] attaches to the suffix skipping the prespecified neutral vowels and since after this all vowels are specified, there is no spreading on the segmental level.

If [y] is neutral then we would never get [analyysi+stä] by this account. The spreading which takes place first at the autosegmental level would necessarily specify the final vowel as [a]. To solve this Vago could always say that [y] is not neutral in these instances and the issue is settled. But in words where there are only "true" neutral vowels, i.e., [i] and [e], afterthe non-neutral ones, Vago's analysis would have more serious problems:

32.



This configuration would always give a final back vowel in Vago's framework. To derive front vowel in the suffix Vago would have to say

- either that sometimes [i] is not neutral but is instead associated to the harmonic tier or
- that the order of the segmental and autosegmental spreading can alternate depending on the case.

Neither of these is desirable and therefore a default analysis is preferred.

SUMMARY

Finnish vowel harmony involves two rules, one prescriptive and one descriptive, and these two result in socially conditioned alternation. The prescriptive rule requires a back vowel in the suffix whenever there is a back vowel in the root; the descriptive rule lets the value of the last non-neutral vowel spread to the suffix and additionally involves an analysis of long loan words into prosodic compounds. In the autosegmental framework, the former rule treats all front vowels as neutral in the harmonic process while the latter follows the "native line" and there are only two neutral vowels. The neutral vowels get their front value by segmental prespecification. Those suffix vowels left unspecified after spreading have their front-value by a late default rule. This default value is supported by the fact that also epenthetic vowels in Finnish are [-back].

It has been suggested (Holman, 1985) that consonant gradation in Finnish has become semasiologized as it, e.g., divides "the lexicon into strata characterized by specific functional-stylistic valencies" (ibid., 290). It seems that the two vowel harmony rules have done the same: they divide the lexicon into two and the alternating cases codify socially significant information.

NOTE

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